Having thus defined the invention, the following is claimed:

1. An electrode detection system for a welder comprising:

a welding wire that is feedable through a contact tip of a welding gun;

a first electromagnetic wave that is at least partially projected and/or scanned laterally across said welding wire at a location at least partially below said contact tip so that at least a portion of said first electromagnetic wave is eclipsed by said welding wire;

a receiver that at least partially receives said first electromagnetic wave; and,

a measuring device that determines at least one parameter of said welding wire based on said first electromagnetic wave received by said receiver.

2. The electrode detection system as defined in claim 1, wherein said first electromagnetic wave includes a laser beam.

3. The electrode detection system as defined in claim 2, wherein said laser beam has a wavelength of about 400-900 nm.

4. The electrode detection system as defined in claim 3, wherein said laser beam has a wavelength of about 500-800 nm.

5. The electrode detection system as defined in claim 4, wherein said laser beam has a wavelength of about 600-700 nm.

6. The electrode detection system as defined in claim 5, wherein said laser beam has a wavelength of about 670 nm.

7. The electrode detection system as defined in claim 2, wherein said electromagnetic generator is at least partially formed by a scanning laser that emits a line of laser beam.

8. The electrode detection system as defined in claim 7, wherein said line of laser beam has a width of about 2-100 mm.

9. The electrode detection system as defined in claim 8, wherein said line of laser beam has a width of about 5-50 mm.

10. The electrode detection system as defined in claim 9, wherein said line of laser beam has a width of about 10-40 mm.

11. The electrode detection system as defined in claim 1, wherein electromagnetic wave substantially lies in a lateral plane, said lateral plane oriented at an angle of about 20-90 to a longitudinal axis of said welding wire of contact tip.

12. The electrode detection system as defined in claim 11, wherein said lateral plane oriented at an angle of about 40-90° to a longitudinal axis of said welding wire of contact tip.

13. The electrode detection system as defined in claim 12, wherein said lateral plane oriented at an angle of about 45-90°, to a longitudinal axis of said welding wire of contact tip.

14. The electrode detection system as defined in claim 1, wherein said first electromagnetic wave is projected laterally across said welding wire at least about 0.01 inch below said contact tip.

15. The electrode detection system as defined in claim 14, wherein said first electromagnetic wave is projected laterally across said welding wire about 0.1-2 inch below said contact tip.

16. The electrode detection system as defined in claim 15, wherein said first electromagnetic wave is projected laterally across said welding wire about 0.2-1.75 inches below said contact tip.

17. The electrode detection system as defined in claim 16, wherein said first electromagnetic wave is projected laterally across said welding wire about 0.25-1.5 inches below said contact tip.

18. The electrode detection system as defined in claim 1, wherein said receiver includes an optical receiver.

19. The electrode detection system as defined in claim 18, wherein said optical receiver includes a charge couple device.

20. The electrode detection system as defined in claim 1, wherein said parameter includes lateral position of said welding wire, roundness or ovality of said welding wire, diameter of said welding wire, twist of said welding wire, defects in said welding wire, debris on said welding wire, lateral position history of said welding wire, roundness or ovality history of said welding wire, defect history of said welding wire, debris history of said welding wire, twist history of said welding wire, diameter history of said welding wire, lateral movement frequency of said welding wire, twist frequency of said welding wire, average length of wire per lateral movement cycle, average length of wire per twist cycle, amplitude of lateral movement of said welding wire, and combinations thereof.

21. The electrode detection system as defined in claim 1, wherein said measuring device utilizes FFT, DFT, histogram, standard deviation and combinations thereof to determine at least one of said parameters of said welding wire.

22. The electrode position detection system as defined in claim 1, wherein at least one of said determined parameters of said welding wire is stored in a memory device.

23. The electrode detection system as defined in claim 22, wherein said stored parameter is correlated to a time, a geographic location, a workpiece, a workpiece region, welding parameter, and combinations thereof.

24. The electrode detection system as defined in claim 1, including a second electromagnetic wave at least partially in a lateral plane that at least partially projected laterally across said welding wire, said lateral plane of said second electromagnetic wave non-parallel to a lateral plane of said first electromagnetic wave, said receiver at least partially receiving said first and said second electromagnetic wave.

25. A method of determining at least one parameter of a welding wire that passes through a contact tip of a welding gun comprising the steps of:

a) passing a welding wire through a contact tip of a welding gun;

b) directing a first electromagnetic wave toward said welding wire such that at least a portion of said first electromagnetic wave is projected laterally across said welding wire at a region on said welding wire that is positioned below said contact tip;

c) receiving at least a portion of said first electromagnetic wave that has passed said welding wire; and,

d) determining at least one parameter of said welding wire based upon the received portion of said first electromagnetic wave.

26. The method as defined in claim 25, wherein said first electromagnetic wave includes a laser beam.

27. The method as defined in claim 26, wherein said laser beam has a wavelength of about 400-900 nm.

28. The method as defined in claim 27, wherein said laser beam has a wavelength of about 500-800 nm.

29. The method as defined in claim 28, wherein said laser beam has a wavelength of about 600-700 nm.

30. The method as defined in claim 29, wherein said laser beam has a wavelength of about 670 nm.

31. The method as defined in claim 26, including the step of generating a line of said laser beam by a scanning laser.

32. The method as defined in claim 31, wherein said line of said laser beam has a width of about 2-100 mm.

33. The method as defined in claim 32, wherein said line of said laser beam has a width of about 5-50 mm.

34. The method as defined in claim 33, wherein said line of said laser beam has a width of about 10-40 mm.

35. The method as defined in claim 25, including the step of orienting said first electromagnetic wave to at least partially lie in a plane having an angle of about 20-90° to a longitudinal axis of said welding wire or contact tip.

36. The method as defined in claim 35, wherein said plane having an angle of about 40-90° to a longitudinal axis of said welding wire or contact tip.

37. The method as defined in claim 36, wherein said plane having an angle of about 45-90°, to a longitudinal axis of said welding wire or contact tip.

38. The method as defined in claim 25, including the step of orienting said first electromagnetic wave to at least partially lie in a plane at least about 0.01 inch below said contact tip.

39. The method as defined in claim 38, wherein said first electromagnetic wave at least partially lies in a plane about 0.1-2 inches below said contact tip.

40. The method as defined in claim 39, wherein said first electromagnetic wave at least partially lies in a plane about 0.2-1.75 inches below said contact tip.

41. The method as defined in claim 25, wherein said step of receiving includes an optical receiver to at least partially receive said first electromagnetic wave.

42. The method as defined in claim 41, wherein said optical receiver includes a charge couple device.

43. The method as defined in claim 25, wherein said parameter includes lateral position of said welding wire, roundness or ovality of said welding wire, diameter of said welding wire, twist of said welding wire, defects in said welding wire, debris on said welding wire, lateral position history of said welding wire, roundness or ovality history of said welding wire, defect history of said welding wire, debris history of said welding wire, twist history of said welding wire, diameter history of said welding wire, lateral movement frequency of said welding wire, twist frequency of said

welding wire, average length of wire per lateral movement cycle, average length of wire per twist cycle, amplitude of lateral movement of said welding wire, and combinations thereof.

44. The method as defined in claim 25, wherein said step of determining includes a device utilizing FFT, DFT, histogram, standard deviation, and combinations thereof.

45. The method as defined in claim 25, including the step of storing a plurality of determined parameters.

46. The method as defined in claim 44, wherein at least one stored determined parameter is correlated to a time, a geographic location, a workpiece, a workpiece region, welding parameters, and combinations thereof.

47. The method as defined in claim 25, including the step of directing a second electromagnetic wave toward said welding wire such that at least a portion of said second electromagnetic wave is projected laterally across said welding wire at a region on said welding wire that is positioned below said contact tip, said first and second electromagnetic wave substantially lying in non-parallel planes.

48. A method of determining a position of a welding wire after the welding wire has passed through a contact tip of a welding gun comprising:

a) feed said welding wire through said contact tip;

b) forming an electric arc between said welding wire and a non-consumable electrode;

c) measuring an arc voltage of said electric arc; and

d) calculating a relative position of said welding wire based upon said measured arc voltage.

49. The method as defined in claim 48, including the step of measuring a relative lateral movement of said welding wire based upon said measured arc voltage.

50. The method as defined in claim 48, including the step of storing a plurality of measure arc voltages, at least one of said stored arc voltages correlated to a time, a geographic location, a workpiece, a workpiece region, and combinations thereof.

51. The method as defined in claim 48, wherein said step of forming includes the formation of an electric arc between said welding wire and a plurality of non-consumable electrodes.

52. The method as defined in claim 51, including a switching mechanism that alternatively connects said plurality of non-consumable electrodes to a power supply.